



Understanding the Solution Report

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Solution analysis provides valuable information on the quality of surface waters, groundwater and nutrient solutions used in crop, livestock and poultry production; aquaculture; and pond management. However, it cannot identify or measure microorganisms, potential pathogens, pesticides or other organic chemical contaminants. To test for these kinds of problems, contact your county health department or a commercial laboratory.

Sample Information This section contains sample information provided by the grower: sample identification number, description of intended use and the solution code. Interpretation of test results depends on the code provided.

Laboratory Results Determinations of elements are reported in parts per million (ppm). The elements routinely measured are 11 of those essential for normal plant growth—major nutrients (P, K), secondary nutrients (Ca, Mg, S) and micronutrients (Fe, Mn, Zn, Cu, B, Na, Cl). The concentration of these elements can influence management practices in both plant and animal production.

EC is reported in units of $\text{mho} \times 10^{-5}$ per cm, which equals $\text{Siemens} \times 10^{-5}$ per cm. It measures dissolved salts and is an indicator of the level of management required for successful use of the solution.

SAR indicates the degree of balance among Ca, Mg and Na. It is useful in predicting the tendency for Na to accumulate in soil where the water is routinely used for irrigation. Where overhead irrigation is used, toxic levels of Na can accumulate on the foliage. Since SAR is a ratio, it has no units.

Hardness indicates the amount of Ca and Mg in water, expressed as ppm of CaCO_3 . It is useful in evaluating water for potential to build up scale or for compatibility with animal medicines. Hard water can indicate high alkalinity.

Total alkalinity is the sum of carbonate and bicarbonate ions reported in ppm. Most alkalinity in North Carolina water is in the bicarbonate form. This value indicates the tendency of water to increase soil pH where irrigation is routinely used. In some plant production systems, alkalinity must be neutralized to avoid increasing substrate pH to levels that do not support plant growth.

AR indicates the number of ounces of battery acid (9.19N sulfuric acid) to apply to each 100 gallons of water to lower alkalinity to a desirable level. The AR is calculated to neutralize 80% of the alkalinity.

$\text{NO}_3\text{-N}$ and **$\text{NH}_4\text{-N}$** are reported in ppm and are primary indicators of water quality. Above normal concentrations could indicate contamination from a well construction problem or some environmental impact in the vicinity of the water supply. Most plants have a high tolerance for nitrogen and use it efficiently. The recommended upper limit for human consumption is 10 ppm. The upper $\text{NO}_3\text{-N}$ limit in animal production varies widely. Most good quality water sources in North Carolina contain under 3 ppm $\text{NO}_3\text{-N}$ and 0.3 ppm $\text{NH}_4\text{-N}$.

Recommendations This section provides comments and suggestions for management, if necessary.

Report Abbreviations

AR	Acid requirement
B	Boron
Ca	Calcium
Cl	Chloride
Cu	Copper
EC	Electrical conductivity
Fe	Iron
IN-N	Inorganic nitrogen
K	Potassium
Mg	Magnesium
Mn	Manganese
N	Nitrogen
$\text{NH}_4\text{-N}$	Ammonium nitrogen
$\text{NO}_3\text{-N}$	Nitrate nitrogen
Na	Sodium
OR-N	Organic nitrogen
P	Phosphorus
pH	How acidic or basic [on a scale of 1 to 14]
S	Sulfur
SAR	Sodium adsorption ratio
Zn	Zinc